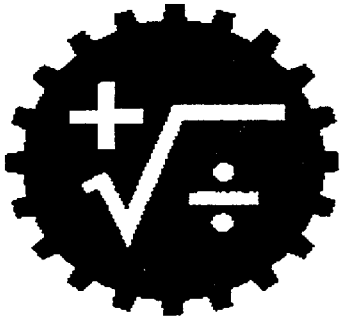
Assessment Annotations
for the Curriculum Frameworks

Mathematics

Grades 4, 8, and 10



Missouri Department of Elementary and Secondary Education
Robert E. Bartman, Commissioner of Education

MATHEMATICS- ASSESSMENT ANNOTATIONS

For The

Mathematics Curriculum Frameworks

The attached document provides supplemental assessment information to *Missouri's Framework for Curriculum Development in Mathematics K-12.* Contained within this assessment supplement are annotations that should be useful in understanding state and local responsibilities in assessing curriculum at the fourth, eighth, and tenth grade levels. This document indicates appropriate content and process specifications that should be useful in establishing curricula that prepares students to be proficient in mathematics.

Since the fourth and eighth grade benchmarks were established by the Framework's design, the column labeled, "What Students Should Know," establishes content that is appropriate for state testing. In addition, at the fourth, and eighth grade, the column labeled "What Students Should Be Able To Do" indicates appropriate processes for assessment. The last column labeled "Assessment Notes" further clarifies whether these processes are best assessed at the state or local level. If the phrase " Grade (4 or 8) state assessment" is shown'then this indicates that this process may be tested on the state mathematics examination at the indicated grade level.

Because benchmarks were not explicitly indicated at the tenth grade, the assessment notes provide information for both the "To Know" and "To Do" columns. The assessment notes indicate whether the content and processes are appropriate for assessment at the tenth grade on the state examination. Under the " Know" and "Do" categories in the assessment notes column, if the notation "Grade 10 state assessment" is indicated then this identifies content and processes that may be assessed at the state level. Under the " Do" of the assessment notes, process items are classified on whether these are assessed at the state level or better assessed at the local level. The notation "Beyond 10th grade state assessment" indicates material that students may or may not have covered at this point and therefore is not tested at the state level.

All of the benchmarks that were identified by the notation, "Grade (4, 8, or 10) state assessment," will not necessarily appear on a state test in any given year. The number of test items developed to access mathematical content and processes may vary from year-to-year. Only Framework pages that required assessment notes are provided within this document which results in the skipping of some page numbers.

VI. Geometric and Spatial Sense

What All Students Should Know	What All Students Should Be Able To Do	Fourth Grade Assessment Notes
By the end of grade 4, all students should know	**NOTE: Each item in** this column is designed to address several elements of "what all students should be able to do."	
1. Standard and nonstandard units of measure.	a. describe, model, draw, and classify shapes (NCTM Standard 9; MO 1.4, 1.6, 2.1)	Do a. Grade 4 state assessment
2. Descriptions of two- and three-dimensional figures.	b. investigate and predict the results of combining, subdividing, and changing shapes (NCTM Standard 9; MO 1.1, 1.6, 3.1)	b. Grade 4 state assessment
3. Geometric shapes are found in the real world.	c. visualize, draw, and compare shapes (NCTM Standard 9; MO 1.8, 2.1, 3.2, 3.3)	c. Grade 4 state assessment d. Grade 4 state assessment
4. Objects can be located by relative position.	d. connect geometric ideas to number and measurement ideas (NCTM Standard 9; MO 1.6, 3.5, 4.1)	e. Local assessment
5. The process of measurement.	e. explore geometry in their world (NCTM Standard 9; MO 1.10, 2.4)	f. Grade 4 state assessment
	f. investigate concepts of lines, angles, similarity, congruence, and symmetry (NCTM Standard 9; MO 1.6, 2.5)	g. Grade 4 state assessment
	g. investigate length, capacity, weight, mass, area, volume, time, and temperature (NCTM Standard 10; MO 1.6, 2.5)	

VI. Geometric and Spatial Sense

What All Studonts Should Know	What All Students Should Be Able To Do	Fourth Grade Assessment Notes
	h. use standard and nonstandard units of measure (NCTM Standard 10; MO 1.10)	
	i. locate objects by relative position including top, bottom, left, right, over and under (NCTM Standard 9; MO 1.6)	Do h. Grade 4 state assessment i. Grade 4 state assessment

VI. Geometric and Spatial Sense

What All Students Should Know	What All Students Should Be Able To Do	Eighth Grade Assessment Notes
By the end of grade 8, all students should know	NOTE: Each item in this column is designed to address several elements of "what all students should be able to do."	
1. Structures of measurement systems,	*By the end of grade 8, all students should be able to*	
2. Descriptions of two- and three-dimensional shapes and their relationships.	a. identify, describe, compare, classify, and represent geometric figures (NCTM Standard 12; MO 1.4, 1.6, 2.1)	Do
3. Geometric shapes are found in the real world.	b. explore transformations of geometric figures (NCTM Standard 12; MO 1.6)	a. Grade 8 state assessment b. Grade 8 state assessment
	c. investigate and apply geometric properties and relationships (NCTM Standard 12; MO 1.6, 2.4, 3.6)	c. Grade 8 state assessment d. Local assessment
	d. use geometry to describe their world (NCTM Standard 12; MO 1.10, 2.4)	e. Local assessment
	e. extend their understanding of the process and structure for measurement (NCTM Standard 13; MO 1.4, 2.6, 2.7)	f. Grade 8 state assessment
	f. select and discuss appropriate units and devices to estimate or make measurements, considering degree of accuracy (NCTM Standard 13; MO 2.6, 3.1, 3.7, 4.1)	

VI. Geometric and Spatial Sense

What All Students Should Know	What All Students Should Be Able To Do	**Eighth** Grade Assessment **Notes**
	g. apply the concepts of perimeter, area, volume, angle measure, capacity, weight, and mass (NCTM Standard 13; MO 2.5, 3.8, 4.1)	Do g. Grade 8 state assessment
	h. investigate the concept of rate of change (NCTM Standard 13; MO 1.4, 1.6, 1.8)	h. Grade 8 state assessment
	i. develop formulas and procedures for determining measures to solve problems (NCTM Standard 13; MO 1.4, 1.6, 1.8, 3.7)	i. Grade 8 state assessment

VI. Geometric and Spatial Sense

What All Students Should Know

By the end of grade 12, all students should know

1 *Structures* of geometric and measurement systems.

2 Properties and relationships of two- and three-dimensional shapes.

3 Geometric shapes can be used to describe the real world.

What All Students Should Be Able To Do

NOTE: Each item in this column is designed to address several elements of "what all students should be able to do."

By the end of grade 12, all students should be able to

a. interpret and draw three-dimensional objects (NCTM Standard 7; MO 1.5, 1.9, 2.7)

b. represent and solve problem situations with geometric models and apply properties of figures (NCTM Standard 7; MO 1.5, 2.7, 3.7)

c. classify figures in terms of congruence and similarity and apply these relationships (NCTM Standard 7; MO 1.1, 1.4, 1.6, 3.5)

d. deduce properties of, and relationships between, figures from given assumptions (NCTM Standard 7; MO 1.6, 1.8, 2.4, 3.5)

e. translate between synthetic and coordinate' representations using a variety of methods and technologies (NCTM Standard 8; MO 1.4, 2.7)

f. deduce properties of figures using transformations and coordinates (NCTM Standard 8; MO 2.4, 3.5)

Tenth Grade Assessment Notes

Do

Know

1. Grade 10 state assessment
2. Grade 10 state assessment
3. Grade 10 state assessment

Do

a. Grade 10 state assessment
b. Grade 10 state assessment
c. Grade 10 state assessment
d. Grade 10 state assessment
e. Local assessment
f. Grade 10 state assessment

VI. Geometric and Spatial Sense

What All Students Should Know	What All Students Should Be Able To Do	Tenth Grade Assessment Notes
	g. identify congruent and similar figures using transformations (NCTM Standard 8; MO 1.5, 3.5, 3.6)	
	h. analyze properties of transformations and relate translations to vectors (NCTM Standard 8; MO 1.6, 2.4, 3.6, 4.1)	Do
	i. apply an understanding of perimeter, area, volume, angle measure, capacity, weight and mass (NCTM Standard 7; MO 2.5, 3.3, 4.1)	g. Grade 10 state assessment h. State-properties of transformations only i. Grade 10 state assessment
	j. model, describe, and analyze maximum and minimum points on a graph (NCTM Standard 13; MO 1.6, 2.1, 4.3, 4.7)	j. Grade 10 state assessment k. Beyond 10th grade state assessment
	k. model, describe, and analyze patterns of sequences through processes of geometric change, approximations, and limits (NCTM Standard 14; MO 1.6, 2.1, 4.3, 4.7)	l. Beyond 10th grade state assessment
	l. recognize and apply trigonometry to problem situations (NCTM Standard 9; MO 3.1, 3.6, 4.2, 4.8)	